



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,613	07/16/2003	Moo Ho Bae	240366US2	6530

22850 7590 05/13/2010
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

JAWORSKI, FRANCIS J

ART UNIT	PAPER NUMBER
----------	--------------

3768

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

05/13/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/619,613	Applicant(s) BAE, MOO HO	
	Examiner FRANCIS JAWORSKI	Art Unit 3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6 is/are allowed.
- 6) ☒ Claim(s) 1 - 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

[Parenthesized claim numbers pertain to the claim or claims being addressed by the immediately preceding claim(s) arguments.]

[The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 – 3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Cole et al (US5617862).

Cole in one embodiment teaches providing a digital receive focus apparatus (upper half of the patent face figure) comprising:

A plurality of channel modules (one or more of the the Digital Multi-Channel Receiver R- 101 which are paralleled to support multiple simultaneous beam reception per col. 8 lines 27 – 31, or one or more of its 64 total constituent channels); including in association

Art Unit: 3768

i) means (R – 108 under FPGA control of a multiplex controller) for multiplexing ultrasound signals originating from at least two ultrasound channels (col. 3 lines 45 – 67), and

means for digitally processing and compensating the multiplexed ultrasound signal (at least digital filter delay R-122 for delay-compensating, and also corrective compensating via at least aberration delays, apodization shading, interference cancellation per col. 10 discussion).

Note that while adjacent element shorting by programmable multiplex switches is practiced fundamentally to provide a large aperture of 128 elements with respect to e.g. 64 processing channels, this aperture in turn may be slid down the array or may serve to provide a synthetic aperture using multiple excitations (see col. 13 lines 43 – 59 and col. 14 lines 28 - 40) hence applicant's claim is readable against the base ' $\lambda/2$ ' concept as well as incorporation into the latter two sliding and synthetic scan patterns since the base claim does not further limit the manner of multiplexing within and/or between receiver acquisition activities such as a time-division multiplexing during a given receiver acquisition. (Claims 1, 3, 5).

Since A/D conversion only occurs later in the ADC R-118 of the Multi-Channel Receiver the receiver multiplexer R – 108 is necessarily analog. (Claim 2).

Claims 1 – 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Van Stalen et al (US6967975).

Van Stalen et al teaches a digital receive-focussing apparatus 110, 120, 130 for use in an ultrasound imaging system comprising.:

A plurality of channel modules 120 , 130 including means 114 for time-division multiplexing signals originating from at least two ultrasound array 112 channels 210 (Fig. 2); and means 120 for digitally processing and compensating for example by a timing reference 180 acting on analog/digital converter 180 for the multiplexed signals from 114 arriving over cable 120. (Claim 1)

Multiplex switch 114 is of analog type since digitization does not occur until after the signal transfers down the array cable. See also col. 1 lines 56 – 57 which states that the signals to the multiplexer switches are analog (Claim 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cole et al in view of Freeman et al (US6208189).

The former is applied as above. It would have been further obvious in view of Freeman firstly to use an analog multiplexer in the former Cole et al teaching (which does not explicitly so state) since, referring to the latter's multiplexer 14 as described in col. 8 lines 19 – 33, in cases such as a sliding aperture case for an array which lacks elevational focus the (for example) eight elements are multiplexed simultaneously

Art Unit: 3768

whereupon the analog switches can withstand the high pulse drive voltages. Such a multiplexed block is subjected to dynamic focus nonetheless along the elevation. (Claim 2)

Additionally Freeman et al note that it is convenient to provide an application specific integrated circuit (ASIC) architecture for an ultrasound system (see col. 1 lines 38 – 43) since this allows the components to easily be arranged on circuit boards interconnected by a high speed bus. (Claim 4).

Additionally Freeman et al note that an ASIC-based analog multiplex switch architecture is particularly adapted for multi-channel multi-beam reception since additional receive capacity for high acquisition throughputs can be added modularly and by expansion of the analog switch connections, see Col. 32 line 65 through col. 33.

Claims 3 – 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Stalen et al as applied to claim 1 above, and further in view of Freeman et al. Since Freeman col. 3 lines 35 – 44 for example is similarly describing activity with a large-number element area array, it would have been obvious in view of the latter to provide receive-focus components in the form of filter-time delay components (see Fig. 3a and 3b associating with front end 10 of Fig. 1), to implement same as an ASIC, and to provide for multi-channel multi-beam reception in order to maintain a scan volume during area array scanning. (Claims 3 – 5).

Allowable Subject Matter

Claim 6 is allowed.

Response to Amendment

The Examiner concurs with applicant's arguments that the rejections based on Hadjicostis et al as applied in the previous action were not sustainable and have been withdrawn.

In the present action, two rejections have been lodged against claims 1 – 5.

The Cole et al – based rejection in effect argues that since the term 'multiplex' merely pertains generically to the combining of signals, the front-end multiplexing which is practiced in Cole et al in order to reduce the number of transducer channels to the number of receive-focussing channels with the multiplex connections being extant for the duration of the scanline or for a scan region's obtainance serves to meet the claim since no further structural specificity concerning temporality of operation or specificity of purpose is recited.

The Van Stalen et al – based rejection in effect argues that assuming arguendo that the (front end) multiplexer of applicant's claim 1 were accorded further structural specificity in that switching activity is occurring during the acquisition of a scan and that a plurality of signal paths are being interleaved into a lesser number of channel modules, i.e. that time-division multiplexed sharing of the channel module between plural ultrasound data paths is occurring for example during the reception of a scan then the argument is made that such occurs in the TDM cable transfer stage of Van Stralen

Art Unit: 3768

et al and the complete multiplexed signal content is then digitized and processed and compensated once it is demultiplexed into its constituent parts.

Henderson et al (US6695783) is cited as of general interest.

This action is NOT made final however the case should be prepared for final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRANCIS JAWORSKI whose telephone number is (571)272-8115. The examiner can normally be reached on weekdays from 11AM to 3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le, can be reached on 571-272-8021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/FRANCIS JAWORSKI/

Examiner, Art Unit 3768